eFields

Ohio State University Extension
Corn Seeding Rate Trial Protocol

Study Overview

The goal of this study is to determine the yield impact of corn seeding rates in Ohio. Information from this trial will be used to improve management recommendations for growers throughout the state. To maximize learning, a minimum of five different seeding rates should be compared. More rates can be added, if adequate space is available The seeding rates compared in the trial need to be different enough to have the potential to affect yield, a minimum difference of 4,000 seeds/acre between each treatment is recommended. It may be necessary to adjust these seeding rates slightly based on your equipment capabilities.

Proper experimental design is important to ensure the validity of yield results at the season end. Plot replication and randomization make it possible for statistical analysis to account for the natural field variation that occurs. For this study, a minimum of three replications should be used and four replications recommended. Plots should be randomized within each replication to eliminate bias due to plot order.

Selecting Seeding Rates

Current recommendations for seeding rate in Ohio are determined by target final stands and average soil productivity. Recommended final stand goals for Ohio are: 35,000 plants/ac for very productive soils (>175 bu/ac average), 30-33,000 plants/ac for average soils (150 bu/ac average), and 26,000 on less productive soils (<120 bu/ac average). These recommendations can be used as a midpoint for determining treatment rates. Another option is to use the farmer's normal seeding rate as one of the middle rates.

- A total of <u>5 seeding rates</u> is recommended <u>replicated no less than 3 times</u> with 4 or 5 replications ensuring a successful study.
- Increments between selected treatment rates should be <u>no less than 4,000 seeds/ac apart</u>.
- Determine the farmers seeding rate for the selected hybrid and use as one of the middle rates.
- Select rates above and below using the 4,000 seeds/ac minimum increments and make sure the farmer is comfortable with final rate treatments.

Example: Farmer plants Hybrid A at 34,000 seeds/ac. Suggested rates could be 22k, 26k, 30k, 34k, & 38k seeds per acre.

Field Dimensions

The field size will determine the total number of plots that can be installed. Remember, at least 3 replications per rate. Plot length is typically determined by the length of the field. All plots should be at least 500 feet long. Plot width will be determined by equipment size. It is important to take into account the size of both the planter and the combine, as well as any application equipment that might impact the trial.

- Full-width or half-width (split-planter) planter width is recommended for a plot width. It will depend on the width of the planter plus the planter's ability to independently control rates if a split-planter setup is selected).
- Estimate the field width then divide by the selected width (full- or split- width) to determine the number of passes / plots available and if you can meet the 5 treatments by 3 replications (15 plots).
- Passes / plots no less than 500-feet (not counting headland rows) are recommended.
- Plots widths consist of two or more combine header widths.

Suggestions
- To maximize learnings, at least 2 fields per county is recommended.
- Evaluate planter and combine width to make sure the selected plot dimensions align properly. Correct alignment of the planter and combine widths will ensure project success.
- Using the variety tracking option using an in-cab display can help manage the project. One can setup the 5 treatments by using the hybrid name then adding A, B, C, D or E (or similar nomenclature) at the end of each name.
  - Before starting each pass, select the treatment corresponding to the plot.
  - Example help guide for the Precision Planting 20/20 display illustrating how to create custom hybrids for a project: https://fabe.osu.edu/sites/fabe/files/imce/images/Precision_Ag/PP20_20_Adding CustomHybrid_0.pdf

Data Collection
5 primary data needs for this project

1. Complete worksheet
2. Field boundary (lat/long of field will work at minimum)
3. As-planted data (if available)
4. Final stand
5. Ear counts (optional)/ qualitative assessment
6. Yield Monitor Data (calibrated); If a yield monitor is not available, a weight wagon can be used to weight the total amount harvested from each plot. Accurate plot dimensions are needed (e.g. width and length of each plot)

Final Stand
Stand counts should be conducted for each plot to determine the final plant stand. Find a representative location within each plot and collect final stand data.

- **Count and record the number of plants in 30 linear feet along two adjacent rows**.

Ear Counts (Optional)
Ear counts can be used to evaluate individual plant response to changes in stand density. Find a representative location within each plot and collect ear count data.

- **Count and record the number of ears on 20 consecutive plants in a row.**
- **Count and record the number of rows per ear.**
- **Estimate the % of the ear filled.**

- **Bonus: Photograph the ears to document differences.**

Example Layouts

Full-width planter layout with 4 replications using 22k, 26k, 30k, 34k, & 38k seeds per acre as treatments.

Planter Pass	Replication	Plot ID	Description	TRT Code
1		101	34,000	D
2		102	30,000	C
3	1	103	38,000	E
4		104	22,000	A
5		105	26,000	B
6		201	38,000	E
7		202	26,000	B
8	2	203	30,000	C
9		204	22,000	A
10		205	34,000	D
11		301	22,000	A
12		302	38,000	E
13	3	303	26,000	B
14		304	30,000	C
15		305	34,000	D
16		401	38,000	E
17		402	30,000	C
18	4	403	34,000	D
19		404	22,000	A
20		405	26,000	B